Applications to Big Data Analytics especially in economics, politics, culture, and business

After teaching students the Big Data Analytics and Mathematical Modelling techniques, we will focus on applying those tools and techniques to analyze real world issues. The applications cover four major fields: economics, politics, culture, and business. In each field, a variety of methods can be employed to conduct empirical studies. For example, in the field of economics, multivariate regression analysis is a powerful tool to determine the causal relationship between economic fundamentals and investors' expectations. In addition, some typical forms of Big Data such as Google Trends data would contribute to an improvement for the predictive power compared to simple time-series econometric models.

In regard to the specific arrangement in part III, we put several articles for each of the four fields, which help students get familiar with the basic paradigm of how to use Big Data Analytics and mathematical models to investigate corresponding research questions. Each lecture will be divided into two segments: First, the instructor and TA will present a summary for each article and highlight the empirical results. Then, according to the class size, students will form into groups. Each group will conduct a replication exercise for an assigned article (notified in advance). Considering the time constraint, the replication exercise does not need to be completed by the end of the lecture, but it needs to be submitted by the beginning of the next class session. The instructor and TA will provide assistance during the process. This practice will lay a technical foundation for the final project.

1. Application of big data analytics in economics

- Baker, S., Bloom, N., & Davis, S. (2016). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics,* 131 (4), pp. 1593-1636. Retrieved from: https://academic.oup.com/qje/article/131/4/1593/2468873/Measuring-Economic-Policy-Uncertainty
- Antenucci, D. et al. (2014). Using social media to measure labor market flows. *NBER Working Paper* 20010. Retrieved from: http://www.nber.org/papers/w20010
- Piketty, T., & Saez, E. (2014). Inequality in the long run. *The Science of Inequality,* 344 (6186), pp. 838-843. Retrieved from: http://science.sciencemag.org/content/344/6186/838.full
- Cavallo, A. (2013). Online and official price indexes: Measuring Argentina's inflation. *Journal of Monetary Economics,* 60, pp. 152-165. Retrieved from: http://www.mit.edu/~afc/papers/Cavallo-Argentina-JME.pdf
- Nordhaus, W. D. (2006). Geography and macroeconomics: New data and new findings. Retrieved from: http://www.pnas.org/content/103/10/3510
- Chetty, R. et al. (2014). Where is the land of opportunity? The geography of intergenerational mobility in the United States. *The Quarterly Journal of Economics,* 129 (4), pp. 1553-1594. Retrieved from: https://academic.oup.com/qje/article/129/4/1553/1853754/Where-is-the-land-of-Opportunity-The-Geography-of

- Choi, H., & Varian, H. (2011). Predicting the present with Google trends. *Selected papers from the 40th Australian Conference in Economics.* Retrieved from: http://onlinelibrary.wiley.com/doi/10.1111/j.1475-4932.2012.00809.x/abstract
- Lazer, D. et al. (2009). Life in the network: The coming age of computational science. Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2745217/

2. Application of big data analytics in politics

- Burnap, P. et al. (2015). 140 characters to victory?: Using Twitter to predict the UK 2015 General Election. *Electoral Studies,* 41, pp. 230-233. Retrieved from: http://www.sciencedirect.com/science/article/pii/S0261379415002243
- LaMarre, H.L., & Suzuki-Lambrecht, Y. (2013). Tweeting democracy? Examining Twitter as an online public relations strategy for congressional campaigns. *Public Relations Review,* 39, pp. 360-368. Retrieved from: http://www.sciencedirect.com/science/article/pii/S0363811113000982
- Colleoni, E., Rozza, A., & Arvidsson, A. (2014). Echo chamber or public sphere? Predicting political orientation and measuring political homophily in Twitter using Big Data. *Journal of Communication,* 64, pp. 317-332. Retrieved from: http://onlinelibrary.wiley.com.ccl.idm.oclc.org/doi/10.1111/jcom.12084/full

3. Application of big data analytics in culture

- Xu, BJ., & Recker, M. (2012). Teaching analytics: A clustering and triangulation study of digital library user data. *Educational Technology & Society,* 15 (3), pp. 103-115. Retrieved from: http://www.jstor.org.ccl.idm.oclc.org/stable/pdf/jeductechsoci.15.3.103.pdf
- Garrido, M. J., & Camarero, C. (2014). Learning and relationship orientation: an empirical examination in European museums. *International Journal of Nonprofit and Voluntary Sector Marketing,* 19, pp. 92-109. Retrieved from: http://onlinelibrary.wiley.com.ccl.idm.oclc.org/doi/10.1002/nvsm.1490/full

4. Application of big data analytics in business

- Einav, L. et al. (2013). Sales mechanisms in online markets: What happened to internet auctions? *NBER Working Paper Series* 19021. Retrieved from: http://www.kellogg.northwestern.edu/research/math/centerinfo/Einav_Farronato_Levin_Sundaresan.pdf
- Einav, L et al. (2014). Sales taxes and internet commerce. *American Economic Review,* 104 (1), pp. 1-26. Retrieved from https://www.aeaweb.org/articles?id=10.1257/aer.104.1.1